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PACKING CONTAINER WITH AN ORIGINALITY MARKING AND METHOD
FOR THE PRODUCTION THEREOF

The invention concerns a packaging container, especially a packaging tube for pasty packaging materials with an anticounterfeiting feature according to preamble of claim 1 and a method to manufacture same according to the preamble of claim 6.

Next to metal tubes, packaging containers of plastic materials (plastic tubes) are widely accepted for packaging, advertising and promotion of technical, cosmetical and pharmaceutical packaging materials of pasty consistence. Due to their diffusion resistance metal tubes used to show for oxidation sensitive packaging materials superiority over plastic tubes. Due to the development of new plastics and laminates, for instance for the manufacture of sheet materials to be used for the manufacture of tube bodies by way of extrusion or by way of the so called side seaming the superiority of metal tubes was widely eliminated, so that metal- and plastic tubes are now considered equals as deformable or squeezable packaging means for oxidation sensitive packaging materials. As addition to the development of new plastics and laminates (tube materials) a highly developed manufacturing technique for plastic has to be considered assuring zero defects tubes. Tube materials and manufacturing techniques result in deformable tubes assuring a consistent quality of the packaging material starting with filling and emptying the tubes. The tubes besides their function as packaging container do next quality as a carrier of advertisement, whereby the displayed advertisement may include identification of the packaged material and other information relevant with respect to the origin thereof.

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**PACKING CONTAINER WITH AN ORIGINALITY MARKING AND
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The invention concerns a packaging container, especially a packaging tube for pasty packaging materials with an anticounterfeiting feature according to preamble of claim 1 and a method to manufacture same according to the preamble of claim 8.

Next to metal tubes, packaging containers of plastic materials (plastic tubes) are widely accepted for packaging, advertising and promotion of technical, cosmetical and pharmaceutical packaging materials of pasty consistence. Due to their diffusion resistance metal tubes used to show for oxidation sensitive packaging materials superiority over plastic tubes. Due to the development of new plastics and laminates, for instance for the manufacture of sheet materials to be used for the manufacture of tube bodies by way of extrusion or by way of the so called side seaming the superiority of metal tubes was widely eliminated, so that metal- and plastic tubes are now considered equals as deformable or squeezable packaging means for oxidation sensitive packaging materials. As addition to the development of new plastics and laminates (tube materials) a highly developed manufacturing technique for plastic has to be considered assuring zero defects tubes. Tube materials and manufacturing techniques result in deformable tubes assuring a consistent quality of the packaging material starting with filling and emptying the tubes. The tubes besides their function as packaging container do next quality as a carrier of advertisement, whereby the displayed advertisement may include identification of the packaged

material and other information relevant with respect to the origin thereof. With respect to mass volume articles like tooth pastes the advertisement upon the tubes in its design specifically directed toward identification of origin and producer, so that consumer decide by way of an optical identification which product they are going buy from what manufacturer, expecting always repeatedly to acquire a product of same quality. With this expectation an optical identification will always be superficial which considering counterfeiting parties will result in problems for the manufacturer of the packaged material and/or the packer with respect to their warranties for origin, quality and consistence of quality. Counterfeitors are for example in a position to provide packaging tubes devoid of any defects in comparison of the originals, under provision here above is understood copying of a specific tube form and design carrying thereon the same imprints as the originals, whereby these counterfeit tubes usually contain packages materials of different quality as the quality offered by non counterfeiting manufacturer. In the event counterfeit products with respect to tubes and/or packaged materials should show quality defects the consumer, not being aware of having acquired a counterfeit product, will attribute the quality defects to the manufacture of original materials which will result for said manufacturer in problems with respect to origin, quality and guaranties of his products.

In consideration of the above described background the inventors did define the object of the herein described invention to provide a packaging container preferable a packaging tube having an anti-counterfeiting feature (following in short also feature) and a method to economically manufacture same, whereby a tube with this fea-

ture even superficially scrutinised visually presents itself as an original and this object is solved with respect to tube by way of the characterising features of claim 1 and for the method by way of the characterising features of claim 8. Advantageous embodiments of the tube are characterised through the claims 2 to 7 and those of the method through the claims 9 to 12.

Two different techniques dominate the manufacture of plastic tubes. The ready made head technique teaches attachment of a ready made head to a tube body, employing as one mode of attachment so to say the melting head on to body by way of application of heat and pressure, while in the second mode head and body are attached to each other by way of an injection moulding process. The form on technique differs there from to the extent that the head and body are attached to each other during formation or moulding of a head in a matrix whereby the moulding of the occurs for one through shaping of a portion of plasticized material or in a second embodiment through injection moulding. Known is also a method which teaches the use of plasticized material portions to connect a prefabricated head with a tube body. The development of these methods did aim at two objectives namely for one to satisfy technical and as a second one appearance requirements. Professional circles strive for the manufacture of leak proof and mechanically strong seams which have to be however optically unobstructive. To provide for a tube with anticounterfeiting feature the invention departs from the teaching of the involved professional circles as set forth above maintaining the mechanical qualities of a seam between head and body however making the seam or parts thereof visible. According to the invention the head carries a feature of dif-

ferent colour as the head. It is preferred to form the feature as a ring encircling the or running around upon the shoulder of the head, which ring is formed and made visible during squeeze pressing of an annular portion of plasticized plastic material of a different colour as the colour of the head or the body to effect the attachment of the head to the body. Advantageously to manufacture tubes with a feature as set forth above a method is used employing for attachment a body to a head a portion of plasticized plastic material in form of a ring preferably of round or lenticular cross-section, the portion being positioned so that it abutts the inner surface of an annular section of the body and rests between or partially upon the outer circumference of the shoulder of the head, thereafter bending the freely extending annular section and squeeze pressing the portion by means of mandrel and matrix in direction of an outlet of the head. After termination of the squeeze pressing or squeeze forming step the annular feature joins the freely running round edge of the annular section so that the ring is positioned from the transition from shoulder to body corresponding to the length of the annular section. This has the advantage that the position of the feature upon the shoulder can be varied by way of varying the length of the annular section. This provides for the opportunity to change the visual appearance of the tube if so required or necessary and further by way of the position of the feature upon the shoulder manufacturing series of tubes can be identified.

Further advantages, features and individual items of the invention can be taken from the following description of the tubes, the process and of an apparatus adapted to practise the process and the drawings, which drawings show:

- Fig. 1 A tube according to the invention in its side view;
- Fig. 2 a mandrel with head having a stepped arrangement;
- Fig. 3 a mandrel with head and a multi-chamber stepped arrangement;
- Fig. 4 a mandrel with head with the circumferential surface in an inclinded position;
- Fig. 5 a matrix the pressing operation not having cominced yet;
- Fig. 6 a matrix after the pressing operation has been performed.

Fig. 1 shows the headside end of a packaging tube 10, following called in short tube 10. The tube 10 consists of a tube body 11, following called body 11 and a tube head 12, following called head 12 which head 12 is connected with the body 11 and carries a cap 13. The head 12 comprises a shoulder 14 and an outlet 16 (fig. 2). The shoulder 14 carries on its outer visible surface, as opposed to its inner surface directed toward the hollow space of the body 11, the anticounterfeiting identification 15 or antiocounuterfeiting fea-

ture 15 according to the invention. Depending upon the requirements of the diffusion resistance of tube 10 the body is made of a plastic monofoil, plastic laminate foil or a plastic/metal laminate foil which cut in strips are formed into a tubular body and welded together along its longitudinal edges. Bodies 11 can also be extruded, in this case the welding operation is not necessary. The bodies 11 are at one of its open ends connected to prefabricated heads 12. The heads 12 are made separately from the tube manufacturer by way of injection moulding. The head comprises a disk like shoulder 14 extending therefrom an outlet 16 which can be opened or closed by means of cap 13.

The outer diameter of shoulder 14 of head 12 is slightly smaller than the inner diameter of the body 11 and dimensioned in such a way that the material used for connecting body 11 and head 12 can during the squeeze forming operation can flow around the circular outer edge of shoulder 14 at the same time filling the gap in form of a ring between the circular edge of shoulder 14 and the inner surface of body 11. Head 12 and body 11 are connected by means of material portion of plasticized plastic which plastic has to be selected so that it connects upon application of pressure and selectively heat with the plastic of head 12 and with the plastic of body 11, in case of a laminate with the inner layer of plastic of body 11.

Fig. 2 shows in schematically a round mandrel 20 as part of a pressing die carrying upon its in longitudinal direction extending surface a tube body 11. The upper free end of mandrel 20 is shaped (contoured) in such a way so that head 12 with its inner

surface can be completely deposited thereon. The head 12 is formed by the disk like shoulder 14 extending therefrom the hollow cylindrical outlet 16 into which extends a centrically arranged mandrel extension 21 so that the head 12 is concentrically held on the contoured free end of mandrel 20.

According to fig. 2 an annular section 22 of body 11 in axial direction extends from the front face starting from the passage 23 between mandrel scope 24 and outer circumference of the mandrel. The axial extension of the annular section 22 is determined (see fig. 4) by the distance A within which the freely running round edge 26 of annular section 22 – seen from the center-line of head 12 – is to rest upon the outer surface of the head 12 thus forming the outer running round demarcation 27 of the anticountering feature 15 (following in short feature 15). The head shows according to fig. 2 a stepped arrangement 29 upon its outer surface which arrangement 29 runs around the outer circumference of shoulder 14 having in direction of outlet 16 upward directed surface 30 forming the inner running round demarcation 28.

According to the invention it can be advantageous to provide the passage 24 between mandrel scope 24 and outer circumference of mandrel 20 with a multi-chamber stepped arrangement 31. Advantageously the multi-chamber stepped arrangement 31 (following in short arrangement 15) comprises two chambers 32, 33 whereby the first chamber 32 originating from the outer circumference of mandrel 20 and in direction of center-line M structured as a slanted surface joins up with the second chamber 33 which chamber 33 ends in mandrel slope 24. The diameter of the orifice closest

to the center-line, that is to say the circumference of the second chamber is dimensioned in such a way that it is covered by the outer circumference of shoulder 14 of head 12, so that the chamber 33 forms with a head 12 arranged on the mandrel 20 and the shoulder 14 of a head 12 an undercut 34 arranged on the front face of mandrel 20, while seen in axial direction the first chamber 32 together with the inner circumferential surface of section 22 of body 11 and the outer surface of shoulder 14 forms an open annular room or space 35 extending in the same axial direction as mandrel 20. As is shown in fig. 3 that way by way of the second chamber 33, arranged under shoulder 14 and by way of annular room 35 adjoining the second chamber 33 a die cavity is provided into which the portion 17 of plastic material plasticized by way of heat and of different colour than the plastic material of the head 12 and if so desired the plastic material of the body 11 can be pressed.

Fig. 4 depicts a circumferential surface arranged parallel to the center-line of head 12 (said parallel surface not shown) whereby the surface of that kind shown is arranged as a slope 36 in respect to the center-line.

Fig. 2, 3 and 4 shown different mouldable connections between body 11 and head 12. The connection according to fig. 2 satisfies normal average requirement, while the connection according to fig. 4 satisfies higher requirements to be full filled by a connection as for instance the one according to fig. 2, since the slope 36 is a greater one sided connecting surface than parallelly arranged surface according to fig. 2. The connection between head 12 and body 11 according to fig. 3 is meant to meet very high requirements to

be satisfied which connection combines by way of the undercut 34 the inner surface (surface directed to the inner room of the body) of head 12 with the surfaces of annular room 35. The arrangement 29 upon the outer surface of shoulder 14 may also be used with head 12 according to fig. 3 and 4. To use the material portion 17 as a ring is preferred, it is also preferred that the ring of circular, lenticular or drop like cross-section is prior to pressing attached to the inner surface of the annular section 22 covering the annular rooms 35.

Fig. 5 and 6 show the means to connect the body 11 to the head 12. In fig. 5 reference numeral 39 depicts a ring shaped or annular matrix into which prior to commencement of the pressing operation a mandrel 20 is entered into carrying a body 11 and head 12 and a material portion 17, whereby the end of the pressing operation is shown in fig. 6. The matrix 39 (shown only in schematic form) can have an inner ring 40 spring biased and movable in the direction of movement of mandrel 20, which ring serves as a hold down device for the head 12 upon mandrel 20 and which serves with its outer diameter as an axially movable moulding wall and resting upon the shoulder 14 will form for instance the inner running round demarcation 28. The moulding contour of matrix 39 is being formed by a cylindrical section 41 and a radius formed section 42. The inner diameter of cylindrical section 41 corresponds to the outer diameter of mandrel 20 with body 11 arranged thereon. The radius formed section 42 is dimensioned in such a way that is moulds the backward part of the annular section 22 as round or radius formed transition from body 11 to head 12 while its forward part during

the pressing operation is brought into contact with the outer surface of the shoulder 14.

The method to connect a prefabricated head 12 with a body 11 by means of forming a ring like connection or seam upon the shoulder 14 of head 12 is operated essentially in six partial steps. The first partial step is loading mandrel 20 with a body 11 in such a way that an annular section 22 of body 11 extends beyond the transition 23 of mandrel slope 24 to outer circumference 25 of mandrel 20. The axial dimension of annular section 22 depends upon the radial distance which the freely running round edge 26 of section 22, which edge 26 forms the outer running round demarcation 28, is designed to show after the pressing operation. Increasing the length of section 22 means that the position of the outer running round demarcation 28 moves up toward the outlet 16 while decreasing its length means the outer running round demarcation 28 would move down toward the transition 23 that means towards the outer circumference of mandrel slope 24. In a second partial step a prefabricated head is arranged upon the mandrel whereby it is arranged thereon by way of the opening of outlet 16 and mandrel extension 21 and in that position the head 12 is being surrounded by the axially extended section 22. In a third partial step the material portion 17 of connecting material is deposited upon the visible outer surface of shoulder 14. It is preferred that the material portion 17 rests against the inner circumference or surface of the annular section 22 completely running around said surface. The material portion 17 consists of a plasticized plastic the composition of which is to be selected in such a way that it connects itself with upon application of pressure and if necessary heat with the plastic

of the head 12 and that of the body 11 in case a laminate is used with the inner plastic layer of body 11. The material portion 17 can be deposited into the die in prefabricated form or extruded upon shoulder 14 preferably covering the annular rooms 35. Preferred a material portions 17 shaped ring like that means as closed rings and the cross-section thereof is preferable of circular, lenticular or drop like configuration. To form or establish the anticounterfeiting feature 15 upon the shoulder 14 the plastic material of portion 17 has a different colour which is significantly different from the colour of the plastic material of the head and if so desired from the colour of the body 11. In a forth partial step head 12 and portion 17 enter into the open annular matrix 39. In case there is provided an inner ring 40 the outer surface of the shoulder 14 gets into contact with the inner ring 40 and moves same during the entering movement of mandrel 20 into the matrix 39 against it's spring biased resistance. During a fifth partial step the pressing and forming of the feature 15 is effected. During this step by way of entering mandrel 20 into matrix 39 the material portion 17 is pressed into annular room 35, stepped arrangement 29 and into the first 32 and second 33 chambers of multi-chamber stepped arrangement 31 connecting head 12 and body 11 at the same time bending the annular section 22 in direction of the outer surface of shoulder 14. The pressing operation is finished when the inner surface of section 22 abutts or is in contact with the outer surface of shoulder 14. During the bending operation part of the material potion 17 is being pressed and flowing by way of the annular section 22 in direction of the outlet 16 until the plastic squeezed over the surface of the shoulder 14 runs or flows against the upward directed surface 30 of the stepped arrangement 29 or flows against the outer

circumference of inner ring 40. In partial step 5 the connection of body 11 and head 12 is effected, the annular section 22 is by means of the plastic of portion 17 squeezed in direction of outlet 16 connected to the shoulder 14 and a ring formed feature 15 on shoulder 14 is formed in a distance encircling the outlet 16, which feature is formed by an inner 28 and outer 27 demarcation circulating upon the outer surface of shoulder 14 means (upward directed surface 30, inner ring 40) forming the inner encirculating demarcation 28 are preferred for a precise configuration of feature 15, it is however possible to let the plastic material flowing in front of the freely running round edge 26 (forming the outer edge of the ring) to flow freely, that means without the means mentioned above over the outer surface of shoulder 14. In a sixth partial step mandrel 20 with tube 10 is moved out of matrix 39, tube 10 is ejected from mandrel 20 whereupon the method to manufacture a tube with feature 15 can be repeated.